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EPR study on higher oxygen pressure synthesized compound Pr2-xGdxCuO4

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Abstract

The electron paramagnetic resonance (EPR) and magnetic susceptibility measurements were performed in Pr2-xGdxCuO4 (x = 0.02; 0.05) annealed at the higher oxygen pressures of 15 and 21 bar. This annealing treatment causes a reduction of about 8% in the second order crystalline electric field (CEF) parameter |b2 0| at the Gd3+ site and leads to a drastic broadening of the Gd3+ resonance lines, which is consistent with spin relaxation processes of Gd3+ due to the first excited state of Pr3+, an increase in the CEF inhomogeneity upon doping and annealing, and an existence of Pr ions in both 3+ and 4+ oxidation states. The exchange coupling constants jPr-Pr and jGd-Pr are also estimated.

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